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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/050,866	01/18/2002	Kiyoshi Yoshizumi	218209US3	9246

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EXAMINER

HODGE, ROBERT W

ART UNIT PAPER NUMBER

1746

DATE MAILED: 05/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/050,866	<b>Applicant(s)</b> YOSHIZUMI ET AL.	
	<b>Examiner</b> Robert Hodge	<b>Art Unit</b> 1746	

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address -

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 January 2006.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4,6,8-23 and 31-50 is/are pending in the application.
- 4a) Of the above claim(s) 2-4,9-12,16-20,22,23,32-36,40-42 and 44-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,6,8,13-15,21,31,37-39,43 and 50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                                   |                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                              | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Claims 11 and 12 are directed to a non-elected species because the claims recite "a flow rate-changing portion which is disposed in the **second flow passage** or the seventh flow passage" and there is no support in figure 6 or anywhere in applicants' specification, for a flow rate-changing portion in the second flow passage of the embodiment found in figure 6. Accordingly, claims 11 and 12 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.01.

### ***Response to Arguments***

2. Applicant's arguments, see Remarks/Argument, filed 7/8/05, with respect to the rejection of claim 1 under 35 U.S.C. 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of WO 00/63993.
3. Applicant's arguments, see Remarks/Argument, filed 7/8/05, with respect to the rejection of claim 6 as being unpatentable by U.S. Patent No. 6,521,204 have been fully considered and are persuasive. The rejection of claim 6 as stated above has been withdrawn.
4. Applicant's arguments see Remarks/Argument, filed 7/8/05, with respect to the rejection of claim 6 as being unpatentable by U.S. Patent No. 6,815,106 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

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However, upon further consideration, a new ground(s) of rejection is made in view of U.S. Patent No. 6,815,106.

5. The rest of applicants' arguments will be addressed in the following rejections because the arguments are directed to the new amendments, which make them moot because the prior art has not been applied to the newly amended claims as applicants state it has.

### ***Claim Language***

6. It appears to the examiner in claims 1, 6, 19, 42, 43 and 50 with the recitation of "a third flow passage which leads to the mixing portion" that the gases in the single third flow passage flow towards the mixing portion through said third flow passage instead of away from the mixing portion, thus all gases are flowing into the mixing portion with no outlet. It is suggested that applicants clarify this minor discrepancy in the above listed claims.

7. For further clarification it appears from applicants' drawings and specification for the elected species that the mixing portion is just a union of two pipes no other device is present for the said mixing portion. Because applicants use open claim language the prior art could mix the gases in a number of fashions including but not limited to in a combustor or condenser as well as just the union of two pipes as disclosed by applicants.

### ***Claim Rejections - 35 USC § 112***

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8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 6 and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claim 6 recites the limitation "the mixing portion" in line 9 of the claim. There is insufficient antecedent basis for this limitation in the claim.

11. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: a mixing portion.

Applicants state in the first full paragraph of their Remarks/Argument that claim 6 does not require the mixing portion of claim 1. However structurally it appears that a mixing element is required, because as so recited it appears to the examiner that the gases must be mixed before being introduced into the gas-liquid separator. If this is not the case then it appears that claim is reciting that there are two gas-liquid separators for the individual exhaust gases, which would be new matter because there is no support for such structure in the elected embodiment.

### ***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1, 8, 13-15 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,696,188 hereinafter Boneberg et al. in view of WO 00/63993 hereinafter Joerissen et al.

14. Boneberg et al. teaches a fuel cell system being supplied with hydrogen and oxygen gases, which in turn generates electric power (column 3, lines 10-15) then mixing the exhaust gas streams from a fuel cell (figure 1 and column 5, lines 1-3) and combusting the mixture catalytically (column 2, line 15 and column 4, line 2) and then venting the combustion product to the atmosphere thus having a reduced hydrogen content (figure 1 and column 5, line 3). The examiner notes that although the Boneberg et al. reference does not explicitly disclose a fuel cell system being fed hydrogen and oxygen gases, it does disclose that a preheated methanol/water mixture in gaseous form is fed to a gas generator, which is for the purpose of generating hydrogen (as disclosed in column 1, lines 10 et seq.) and because of this disclosure it is inherent that hydrogen and oxygen gas are fed to a fuel cell installation. It is also inherent that electric power will be generated by feeding a fuel cell hydrogen and oxygen gases, since this is the purpose of a fuel cell (this inherency statement applies to all proceeding rejections). Otherwise there would be no anode and cathode exhaust gases to be further reacted or used for preheating purposes in the system disclosed by Boneberg et al. The examiner further notes that the Boneberg et al. reference teaches that in a preferred embodiment a non-catalytic combustor would be preferred, however it still

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teaches the use of a catalytic combustor which is well known in the art, therefore it still reads on the claims as so recited.

15. Boneberg et al. does not teach a valve used to block the flow of hydrogen to the mixing portion, recycling hydrogen exhaust to the fuel cell inlet, the use of a hydrogen occluding alloy tank for hydrogen storage, a pump to pump hydrogen exhaust to the fuel cell inlet or hydrogen from the tank, a flow rate-reducing portion a gas-liquid separator used for just the cathode exhaust or a controller.

16. As per the provided German office action translation Joerissen et al. teaches “a fuel cell unit that is connected with a hydrogen storage device (in particular a metal hydride storage device) by means of a passage provided with a pressure reduction valve (re claims 8 and 9, cf. (2): claims 1 and 4., Fig. 1 with pertinent description). From the anode chamber outlet of the fuel cell, unreacted hydrogen is returned to the anode chamber inlet by means of a pump (re claim 10, cf. (2): claim 1; Fig. 1 and pertinent description). Via a further passage with a valve, hydrogen-containing anode off-gas can be discharged from the circular flow (re claim 7, cf. (2): claim 7; Fig. 1 with pertinent description). The passages for discharging anode and cathode off-gas are provided with condensed water separators (re claims 6 and 19, cf. (2): claims 7 and 8., Fig. 1 with pertinent description).” Joerissen et al. also teaches a control/regulating unit for controlling the various devices as described above (abstract).

17. At the time of the invention it would have been obvious to a person of ordinary skill in the art to include all of the features of Joerissen et al. to improve Boneberg et al.’s fuel cell system. The motivation for doing so would have been to provide a system

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that safely stores hydrogen and utilizes the supplied hydrogen to its fullest extent without waste. As well as adding a pump or flow rate-reducing portion to best control the supply of hydrogen to the fuel cell in order not to over load the fuel cell with too much pressure, but at the same time increasing the pressure when necessary. Adding a water separator to the cathode exhaust to remove all of the excess water that is formed during the reaction of hydrogen and oxygen in the fuel cell before entering the catalytic combustor to prevent it from being flooded and thus not being able to function. And including a controller to control all of the various devices to properly regulate everything in the system so that it performs optimally.

18. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boneberg et al. in view of Joerissen et al. as applied to claims 1, 8, 13-15 and 50 above, and further in view of DE 4219113 hereinafter Heinen et al.

19. Boneberg et al. and Joerissen et al. do not teach the use of a diffusion member.

20. As per the provided German office action translation Heinen et al. teaches "off-gas tubes provided in the outlet portion with twisting or mixing elements or baffle plates to prevent a straight flowing of the off-gases and to promote the mixing-through with the ambient air (re claims 16 to 18 and 21 to 23, cf. (4) claims 1 and 3; column 1, lines 50 to 54; Fig. 2 with pertinent description)". The examiner notes that the mixing elements or baffle plates as taught by Heinen et al. are equivalent to the diffusion member or shield member of the instant application since the claimed structure is not specific as to what the actual member really is. And since the disclosure of the Heinen et al. reference



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performs the same function as the instant application it reads on the claims as so recited.

21. Boneberg et al., Joerissen et al. and Heinen et al. are analogous art because they are from similar problem solving area of exhausting off gasses from a system after a combustion reaction.

22. It would have been obvious to modify Boneberg et al. to include a shield or diffusion member at the exhaust port in order to prevent a straight flowing of the off-gases and to promote the mixing-through with the ambient air.

23. Claims 37-39 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boneberg et al. in view of Joerissen et al. as applied to claims 1, 8, 13-15 and 50 above, and further in view of U.S. Patent No. 2,850,038 hereinafter Shabaker.

24. Boneberg et al. and Joerissen do not teach any properties of the flow-rate reducing portion.

25. Shabaker teaches a flow control device for gaseous material employing variable diameter orifices that can in particular be smaller or larger depending on the control conditions (column 1, lines 15-21 and column 4, lines 3-60).

26. Boneberg et al., Joerissen et al. and Shabaker are analogous art because they are from similar problem solving area of controlling the flow of gases.

27. At the time of the invention it would have been obvious to a person having ordinary skill in the art to include the flow control device in the Boneberg et al. reference in order to properly control any and all of the gases in the system to optimally operate the system.

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28. Claims 6 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,815,106 hereinafter Salvador et al.

29. Salvador et al. teaches that it is well known to use fuel cells in vehicular applications (column 2, line 9) and also teaches a fuel cell system that is fed hydrogen and oxygen gas for the purpose of generating electric power wherein the exhaust gases of the fuel cell are mixed in a combustor and are reacted to reduce the amount of hydrogen and vented to the atmosphere (figure 1 and column 4, lines 23 et seq.). Salvador et al. further teaches the use of a pressure-loss member in the cathode exhaust line (column 3, lines 5-7) as well as the use of condensers to remove water from the gas streams (column 4, lines 46-47 and figure 1).

30. Salvador et al. does not teach the specific order of the components as claimed in claim 6.

31. At the time of the invention it would have been obvious to a person having ordinary skill in the art to switch the order as to which the exhaust gases flow so as to have them first flow through the condenser and then the combustor, thus removing moisture which could cause the combustor's catalyst to fail due to flooding of the catalyst sites and since it has been held that a mere reversal of essential working parts of a device involves only routine skill in the art. In re Einstein, 8 USPQ 167.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Hodge whose telephone number is (571) 272-2097. The examiner can normally be reached on 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RWH 4-27-06

MICHAEL BARR  
SUPERVISORY PATENT EXAMINER

A handwritten signature in black ink, appearing to read 'Michael Barr', is written over the printed name and title.